

In the Claims

Please amend the claims as follows:

1. (Currently amended) A distal tip for a catheter comprising:

first and second lumens extending therethrough, wherein in an operative configuration, the first and second lumens are coupled to first and second lumens of a dual lumen catheter;

a first opening fluidly connected to the first lumen for inflow of fluid from a body lumen into which the distal tip is inserted in a normal mode of operation and for outflow of fluid thereinto in a reverse mode of operation;

a second opening fluidly connected to the second lumen, the second opening being disposed distally from the first opening and separated therefrom by a selected stagger distance for outflow of fluid therefrom when the catheter is in the normal mode of operation and for inflow of fluid from the body lumen in a reverse mode of operation;

a contoured flow deflection element directing, in the reverse mode of operation, outflow from the first opening away from the second opening;

a contoured outlet portion of the second opening reducing an outflow velocity therefrom in the normal mode of operation; and

side walls extending between the first opening and the contoured flow deflection element, the side walls being on the same side as the first opening.

2. (Original) The distal tip according to claim 1, wherein the first and second openings are disposed on opposite sides of the distal tip with respect to a longitudinal axis thereof.

3. (Original) The distal tip according to claim 1, wherein the first and second opening have orifices extending in planes angled with respect to a longitudinal axis of the distal tip.

4. (Previously Amended) The distal tip according to claim 1, wherein the contoured flow deflection element is adapted to direct outflow from the second opening away from the first opening in the normal mode of operation.

5. (Original) The distal tip according to claim 1, further comprising an atraumatic tip formed at a distal end of the distal tip.

6. (Original) The distal tip according to claim 1, wherein the first opening includes a first ramp

portion deflecting outflow therefrom away from a longitudinal axis of the distal tip in the reverse mode of operation.

7. (Canceled).

8. (Original) The distal tip according to claim 1, wherein the second opening includes a second ramp portion deflecting outflow from the second opening away from a longitudinal axis of the distal tip in the normal mode.

9. (Original) The distal tip according to claim 1, wherein the second opening comprises an expanded section increasing an exit plane cross sectional area of the second orifice.

10. (Original) The distal tip according to claim 1, wherein the first and second lumens have substantially D shaped cross sections.

11. (Original) The distal tip according to claim 1, further comprising a contoured bolus including a first ramp substantially aligned with the first opening, a second ramp aligned with the second opening and an atraumatic distal tip.

12. (Original) The distal tip according to claim 11, wherein a maximum radial dimension of the contoured bolus is less than a radius of a catheter to which the distal tip is to be coupled.

13. (Original) The distal tip according to claim 1, wherein the selected stagger distance is between about 1.0 cm and 1.5 cm.

14. (Withdrawn) The distal tip according to claim 11, wherein a maximum radial dimension of the contoured bolus is substantially the same as a maximum radius of the distal tip.

15. (Withdrawn) The distal tip according to claim 1, wherein the second opening has a dimension substantially equal to a dimension of the first opening.

16. (Currently Amended) A flow control tip for a multi-lumen catheter comprising:
an attachment portion adapted to fluidly connect to a distal portion of a catheter; and
a contoured bolus defining at least a portion of an inlet and an outlet of the distal tip so

that, when coupled to the catheter, the inlet is coupled to a first one of the catheters lumens and the outlet is coupled to a second one of the catheters lumens, and a flow deflector directing fluids exiting the inlet in a first mode away from the outlet and side walls on the same side as the inlet extending between the inlet and the bolus, wherein the contoured bolus defines a specified stagger distance between the inlet and the outlet.

17. (Original) The flow control tip according to claim 16, wherein the contoured bolus further comprises a second flow deflector directing fluid exiting the outlet in a second mode away from the inlet.

18. (Original) The flow control tip according to claim 16, wherein the inlet and the outlet are formed on opposite surfaces of the contoured bolus.

19. (Original) The flow control tip according to claim 18, wherein the flow deflector comprises a ramp disposed adjacent an inlet opening.

20. (Original) The flow control tip according to claim 18, wherein the contoured bolus defines an expanded section at the outlet increasing an exit plane cross-sectional area of the outlet.

21. (Original) The flow control tip according to claim 20, wherein a size of the expanded section is selected to reduce an exit pressure of the fluid to a predetermined level.

22. (Withdrawn) The flow control tip according to claim 20, further comprising a split in a distal end of the flow control tip cooperating with the expanded section to increase the exit plane cross-sectional area of the outlet.

23. (Original) The flow control tip according to claim 16, wherein the attachment portion is adapted for attachment to the catheter by one of a mechanical fitting, a friction fitting, chemical bonding and thermal bonding.

24. (Withdrawn) The flow control tip according to claim 16, wherein at least portions of the flow control tip are formed integrally with the catheter.

25. (Withdrawn) A distal tip for a multi-lumen catheter comprising:
first and second lumens extending therethrough, wherein in an operative configuration,

the first and second lumens are coupled to first and second lumens of the catheter;

a first opening fluidly connected to the first lumen for inflow of fluid from a body lumen into which the distal tip is inserted in a normal mode of operation and for outflow of fluid thereinto in a reverse mode of operation;

a second opening fluidly connected to the second lumen, the second opening being disposed distally from the first opening and separated therefrom by a selected stagger distance for outflow of fluid therefrom when the catheter is in the normal mode of operation and for inflow of fluid from the body lumen in a reverse mode of operation;

an intermediate wall extending along a longitudinal axis of the distal tip and separating the first and second lumens from one another, wherein an extension portion of the intermediate wall extends beyond the first opening to the second opening; and

a contoured bolus overmolded on the extension portion and including a contoured flow deflection element directing, in the reverse mode of operation, outflow from the first opening away from the second opening.

26. (Withdrawn) A distal tip for a catheter comprising:

first and second lumens extending therethrough, wherein in an operative configuration, the first and second lumens are coupled to first and second lumens of a dual lumen catheter;

a first opening fluidly connected to the first lumen for inflow of fluid from a body lumen into which the distal tip is inserted in a normal mode of operation and for outflow of fluid thereinto in a reverse mode of operation;

a second opening fluidly connected to the second lumen, the second opening being disposed distally from the first opening and separated therefrom by a selected stagger distance for outflow of fluid therefrom when the catheter is in the normal mode of operation and for inflow of fluid from the body lumen in a reverse mode of operation;

an intermediate wall extending along a longitudinal axis of the distal tip and separating the first and second lumens from one another, wherein an extension portion of the intermediate wall extends beyond the first opening to the second opening;

a longitudinal slit formed through the extension portion of the intermediate wall, sides of the slit separated from one another to form an expanded distal portion of the second lumen; and

a contoured bolus overmolded over the slit portion of the intermediate wall and the expanded extension portion of the second lumen and including a contoured flow deflection element directing, in the reverse mode of operation, outflow from the first opening away from the second opening.

27. (Withdrawn) A distal tip for a catheter comprising:

first and second lumens extending therethrough, wherein in an operative configuration, the first and second lumens are coupled to first and second lumens of the catheter;

a first opening fluidly connected to the first lumen for inflow of fluid from a body lumen into which the distal tip is inserted in a normal mode of operation and for outflow of fluid thereinto in a reverse mode of operation;

a second opening fluidly connected to the second lumen, the second opening being disposed distally from the first opening and separated therefrom by a selected stagger distance for outflow of fluid therefrom when the catheter is in the normal mode of operation and for inflow of fluid from the body lumen in a reverse mode of operation;

an intermediate wall extending along a longitudinal axis of the distal tip and separating the first and second lumens from one another, wherein an extension portion of the intermediate wall extends distally beyond the second opening; and

a first projection mounted on a first side of the extension portion and directing outflow of the fluid from the first opening in the reverse mode of operation away from the extension portion, a proximal end of the first projection substantially aligned with the second opening and a distal end of the first projection proximal of a distal end of the extension portion.

28. (Withdrawn) The distal tip according to claim 27, further comprising:

a second projection mounted on a second side of the extension portion opposite the first side, the second projection directing outflow of the fluid from the second opening in the normal mode of operation away from the extension portion, a proximal end of the second projection spaced from the second opening and a distal end of the second projection substantially aligned with the distal end of the first projection.